

**ANDHRA PRADESH PARA MEDICAL BOARD**  
**HYDERABAD**

**(Established Under the Andhra Pradesh Para Medical Board Act, 2006)**

**(A.P. Act No. 38 of 2006)**

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**Syllabus for**  
**DIPLOMA IN CATHLAB TECHNICIAN COURSE**  
**(TWO YEARS COURSE)**

**B.N.S. Kumar**  
**Secretary**

In view of representation from the Faculty in Government colleges, in State of AP.  
 The Syllabus for the 1<sup>st</sup> year in all Para medical courses is modified accordingly the  
 modified Syllabus for 1<sup>st</sup> year is kept on website.

<b>DIPLOMA IN CATHLAB TECHNICIAN COURSE (TWO YEARS COURSE)</b>	
<b>Syllabus for First Year</b>	
<b>Paper-I</b>	<p><b><u>BASIC HUMAN SCIENCES</u></b></p> <p>A) Basics of Anatomy            B) Basics of Physiology            C) Basics of Bio-chemistry            D) Basics of Bio-statistics</p>
<b>Paper-II</b>	<p><b><u>PHYSICAL SCIENCES</u></b></p> <p>A) Basics of Pathology            B) Basics of Blood Banking            C) Basics of Microbiology            D) Basics of Central sterilization.</p>
<b>Paper-III</b>	<p>A) Hospital awareness,            B) Familiarization of different tables/tubes in surgical dept. Surgical Awareness, Preparation of patient for surgery.            C) Patient related services.            D) Communication &amp; Computer Skills, Audio And Visual Aids.</p>

**DIPLOMA IN CATHLAB TECHNICIAN COURSE  
(TWO YEARS COURSE)**

**Syllabus for Second Year**

**Paper-I**

- A) Cardiac Catheterization, Cardiac Physiology, Contents of the Thorax, Anatomy, Physiology and Conduction of the heart,
- B) The Arteries, Veins & Capillaries, the Superior vena cava, The Inferior vena cava, the aorta and its branches, the total circulation
- C) The pulmonary circulation, The Systemic circulation
- D) The Coronary Arteries, Veins, Sinus, Circulation

**Paper-II**

- A) Devices used in pacing pacemaker and its types, components of pace maker, functions of the pace maker, warnings & precautions
- B) PDA devices, Indications and types of devices, PDA occlusion system, potential complication
- C) ASD devices device description, indications & usages, contraindications, warnings
- D) Device protocol, pre & post procedure protocol, Hypothermia Classification, signs and symptoms, causes, management

**Paper-III**

- A) Cardio vascular Physiology, Cardio Pulmonary Resuscitation (CPR) Indications, Basic Concepts, CPR for Adult / Child / Infant / Neonate.
- B) Congenial Heart Diseases
- C) Electro Cardio Graphy (ECG) Concepts, 12 Lead System, ECG For Children, Coronary Instrumentation. Components of ECG, Abnormal ECG Recording, Normal ECG, Abnormal T- Waves, Abnormal QRS Segment
- D) Instrumentation Study, Instrument Measurement & Critical Care Equipment.

# 1<sup>st</sup> YEAR

## PAPER-I

### Basics of Anatomy & Physiology

#### **Basics of Anatomy**

1. Introduction to Human Anatomy
2. Cell- Tissues Properties, Different Tissues
3. Digestive System & Hepatobiliary System
4. Respiratory System
5. Cardio Vascular System
6. Lymphatic System
7. Bones and Joints
8. Nervous System
9. Endocrine System
10. Sense Organs
11. Excretory System
12. Reproductive System

#### **Basics of Physiology**

1. Introduction to Human Physiology
2. Blood
3. Cardio Vascular System
4. Lymphoid System
5. Digestive System
6. Respiratory System
7. Nervous System
8. Endocrine System
9. Excretory System
10. Reproductive System
11. Sense Organs

## Basics of Bio – Chemistry

1. Introduction to Basics of Bio-chemistry including code of ethics for Medical Lab Technicians and Medical Lab Organization.
2. Reception, Registration and bio-chemical parameters investigated.
3. Glassware and plastic ware used in a bio-chemical laboratory.
  - a. **Glassware:**
    - 1) Types of glass and composition.
    - 2) Types of glassware used, their identification, application & uses.
    - 3) Cleaning, drying, maintenance and storage of glassware.
  - b. **Plastic ware: Brief outline**
4. Instrumental methods of Bio-chemical analysis.
  - a. **Colorimetry :**

Visual and photoelectric methods, instrumentation, principle & laws involved construction, operation, care and maintenance, applications.
  - b. **Spectrophotometry**

Principle and theory, types, construction, & applications
5. Basic lab operations like
  - a. **Separation of solids from liquids**
    1. Centrifugation: Principle, Different types of centrifuges care and maintenance, applications.
    2. Filtration using funnel.
    3. Weighing : Different types of balances used, care and maintenance.
    4. Evaporation
    5. Distillation
    6. Refluxing
    7. Drying different salts and dessication.

6. Water Chemicals and related substances
  - a. Purity of chemicals
  - b. Corrosives
  - c. Hygroscopic Substance
7. Prevention, Safety and first aid in lab accidents.
8. Collection of Specimens
  - a. **Blood:** Types of Specimens, Collection, Precautions during collection processing and preservation.
  - b. **Urine:** Types of Specimens, Collection, Precautions during collection, Processing and Preservation.
9. Urine biochemical parameters.
10. Units of measurements
11. **Solutions** : Types based on solute and solvent, Types based on method of expressing concentration, calculations.
12. **Carbohydrates:** Definitions, Biological importance, Acid value, iodine value, saponification value.
13. Amino acids and Proteins Definition, Biological importance, Classification, Qualitative tests.
14. **Diagonistic tests** : Blood sugar, Glucose tolerance test, Blood urea, Serumuric acid, Serum creatinine.
15. **Vitamins and Minerals**
  - a. **Vitamins:**  
Water Soluble vitamins, Fat Soluble vitamins, Sources, Daily requirements, Deficiency diseases.
  - b. **Minerals :**  
Sources, Daily requirements, Deficiency diseases.

# Paper-II

## Basics of Pathology

### Introduction to Pathology in brief

1. Urine – Analysis – Physical Examination – specific gravity PH, reaction, colour.  
Chemical Examination – Sugar Albumin, bile salts, bile Pigments etc.  
Microscopic, Sediment for RBC, WBC, Epitheleal cells, casts, crystals, parasites.  
Preparation of Reagents, procedure and principle of tests.
2. **Sputum Analysis** – Physical Examination, Preparation and staining smear for Microscopic Examination.
3. **Semen Analysis** – Physical Examination Microscopy – counting, motility, staining, Morphology, abnormal and normal forms.
4. **Body Fluids** – Differential count of Peritoneal, pericardial, pleural fluids and CSF, charging chamber, Identifying and counting the cells.

# Basics of Microbiology

## I. Introduction to Microbiology in brief

Definition,  
History

## II. Microscopy

- a) Principle working and maintenance of compound Microscope.
- b) Principle of Fluorescent microscope, Electron Microscope, Dark Ground Microscope.

### **History**

**Types of Microscope:** (a) Light Microscope, (b) DGI, (c) Fluorescent, (d) Phase contrast.

**(e) Electron Microscope :** a). Transmission, b) Scanning, Principles of operational mechanisms of various types of Microscopes.

## III. Sterilization and disinfection – classification and Methods of sterilization.

### **Sterilization: Definition, types and principles of sterilization methods:**

(a) Heat (dry heat, moist heat with special reference to autoclave, (b) Radiation, (c) Filtration, efficiency testing to various sterilizers.

### **Antiseptics and Disinfectants :**

Definition, types and properties, mode of action, uses of various disinfectants, precautions while using the disinfectants, qualities of a good disinfectants, testing efficiency of various disinfectants.



- 1) Principle and Methods of sterilization by heat
  - a) By Dry Heat, flaming, Red Heat, Hot air oven, incineration.
  - b) By Moist Heat-pasteurization, Inspissation, tyndalisation, autoclave.

2) Filtration Methods

- 3) Ionising Radiation – Disinfection, Mode of action and uses of important chemical disinfectants – Phenol and Phenolic compounds, alcohols, halogens, dyes and acids and alkalis.

4) Gaseous Methods of sterilization.

- IV. Cleaning, drying & Sterilization of Glassware disposal of contaminated material i.e. clinical infective material inoculated culture media. Handling and Disposal of Biomedical waste.
- V. **Biomedical waste management in a Microbiology Laboratory** : types of the waste generated, segregation, treatment, disposal.
- VI. Morphology and classification of Bacteria Sp. of cell, capsule, flagella, spore, Anaerobic Methods of cultivation of Bacteria.

# Paper-III

## **A. Hospital Awareness**

A brief idea of hospital as an organization management different units of a hospital effective communication skills, communication channel

Maintenance of records  
Effective leadership  
General patient care  
Medical terminologies  
Vital signs  
Unit preparation  
Transporting & Transferring patients  
Sterilization Techniques  
Control of infection  
Medication – Oral & parenteral  
Admission – Discharge procedure  
Bandages

Practicals : Posted in ward & taught clinically

## **A. Surgical Department**

Familiarization of different tubes

1. Drainage tube
2. Post Operative Exercises
3. Post OP Management of Patient
4. Shock of Management
5. Changing Surgical Dressing.

1. Preoperative preparation of patient
2. Preanesthetic preparation
3. Assisting in operation
4. Anaesthesia
5. CSSD
  1. Recovery room
  2. Movement of papers
  3. Scheduling of theaters
  4. Supplying of articles
  5. Specific area practices
    - a. As scrubnurse
    - b. As circulating nurse

## **D).Communication and Computer Skills, Audio & Visual Aids.**

### **COMMUNICATION**

Process  
Types of communication  
Strategies for effective Communication  
Barriers of communication

### **SOFT SKILLS**

Presentation with the use of visual aids such as power point  
Conversation  
Extempore speech, usage of effective language for communication of health work.  
Case studies and situational analysis  
Survey and Reporting

### **COMPUTER**

Computer basic  
MS – Office  
MS – Word  
MS – Excel  
MS – Power Point

### **INTERNET CONCEPTS**

Browsing  
Down- Loading  
Use of Slide Projector

### **PRACTICALS**

1. Monitoring of vital signs, Spo2
2. ABG analysis
3. Types of Anesthesia required for different types of surgeries
4. A regular check of cannula and drains
5. Maintain records and reports
6. Transportation of patient to SICU
7. Suctioning of Endotracheal tube / Tracheostomy tube
8. After care of equipment
9. Mechanical ventilation – Settings and modes

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# **CATHLAB TECHNICIAN TRAINING COURSE**

## **(Second Year)**

The trainees of Cathlab technician course shall know the structure and function of the heart. The anatomy of the blood vessels, and the roles of the different types of vessel in the circulatory system.

General structure and function of the heart, including:

- The role of the heart in circulation
- Valves and supporting apparatus.
- Chambers
- Main coronary arteries and veins
- Great veins and arteries
- Pericardium

Simple anatomy and function of the specialized conduction system:

- Sinus node
- Atrioventricular node
- Bundle of His
- Left and right bundle branches
- Purkinje fibres

Pathology of the Cardiovascular System

Understands common pathological terms used in description of heart disease and, where applicable, associated electrocardiographic features.

Knows the meaning of the terms:

- Atherosclerosis; atheroma
- Ischaemia
- Angina pectoris,
- Unstable angina.
- Prinzmetal's angina
- ST-elevation and non-ST elevation myocardial infarction
- Acute coronary syndrome
- Necrosis
- Hypertension.
- Atrial and ventricular septal defects.
- Cyanosis.
- Coarctation of the aorta.
- Valvular stenosis and regurgitation
- Pericarditis

## **PAPER-I**

### **CARDIAC CATHETERIZATION:**

1. Percutaneous Transluminal Coronary Angioplasty (PTCA)
2. Balloon Mitral Valvuloplasty.
3. IABP.
4. Pressure Recording.
5. Precath Evaluation with check lists.
6. Care of the patient following Catheterization, Angiography and Interventions.
7. Pre and post procedural care in temporary and permanent pacing.

## **PAPER-II**

### **CARDIOVASCULAR PHYSIOLOGY / ANATOMY / PATHOLOGY**

#### **CARDIAC PHYSIOLOGY**

1. Cardiac cycle
2. Cardiac output
3. Haemodynamics
4. Pulmonary vascular resistance

#### **PATHOLOGICAL FEATURES OF CONGENITAL HEART DISEASES**

1. Obstruction
2. Communication
3. Anomalous connections
4. Recognition of CHD in adults.

#### **CARDIAC LESIONS & MYOCARDIAL DEFECTS**

5. Definitions
6. Morphology
7. Clinical Manifestation
8. Investigation

#### **VASCULAR LESIONS (Deep vein thrombosis, Arteriosclerosis valvular stenosis)**

9. Definitions
10. Morphology
11. Clinical Manifestation
12. Investigation
13. Definitions
14. Morphology
15. Clinical Manifestation
16. Investigation

**PAPER-III**  
**CONGENITAL HEART DISEASES AND PHYSIOLOGY**

**CONGENITAL HEART DISEASES**

1. History of the patient
2. Cardiovascular examination
3. Cardiac Examination

**ACYANOTIC HEART DISEASE**

4. Types
5. Etiology
6. Manifestation

**CYANOTIC HEART DISEASE**

7. Types
8. Etiology
9. Manifestation

**CORONARY INSTRUMENTATION**

**CORONARY ANGIOGRAM – EQUIPMENT USED**

1. Definitions & Indication
2. Catheters used and equipment
3. Use of pressure ejector
4. Monitoring

**PRECAUTIONS TRANSLUMINAL CORONARY ANGIOPLASTY**

5. Definitions & Indications
6. Equipment and procedures
7. Monitoring and after care
8. Complications

**PERCUTANEOUS BALLOONING**

9. Indications
10. Interventions carried out
11. Equipment used
12. Monitoring and after care

**ASD/VSD DEVICE CLOSURE**

13. Indications
14. Interventions carried out
15. Equipment required
16. Monitoring

## **PRE & POST PROCEDURE CARE**

1. Investigations
2. Pre cath evaluation
3. Monitoring during procedure
4. Post cath protocol
5. Precautions to be observed

## **RADIOLOGY**

6. Monitors in control
7. Operation of control system
8. Radiography : Simple plane, Biplane, DSA
9. Film processing & CD recording
10. Protective equipment, lead aprons, Badges
15. Radiology:
  - a) Single plane
  - b) Biplane
  - c) DSA.
16. Film processing
17. CD recording.

## **EMERGENCY CARE**

18. Cardiac monitoring
19. Intubation, Bagging
20. Warmer
21. Emergency drugs

## **List of Practicals:**

1. Operation of the control system in C.C. Lab.
2. Operation of the Angiographic Table, Various angulations in Coronary Angiography.
3. Operation of blood Oximeter.
4. Operation of Tagarno.
5. Monitoring in I.C.C.U.
6. Operation of Film Processing machine.
7. Operation of CD recording in C.C. Lab.
8. Assisting during Temporary and Permanent Pacing.
9. Operation, Calibration, and Servicing of E.C.G. Machines.
10. E.C.G. Recording – in Adult & Pediatric Patients.
11. Stress E.C.G. Recording
12. Holter Recording.
13. Recording and interpretation of Blood Pressure.
14. Operation of Echocardiographic equipment and maintenance.
15. Cardio Pulmonary Resuscitation.